THE

CHICAGO MEDICAL JOURNAL.

VOL. XXIII. MAY, 1866. No. 5.

ORIGINAL CONTRIBUTIONS.

The Use of the Thermometer in Clinical Medicine. By E. C. SEGUIN, M. D., of New York City.

Believing that the matter may prove of interest, and that the attention of practitioners may thus be called to a means of diagnosis and prognosis not second in importance to any single one hitherto employed, the following cases of pneumonia, observed and treated in the New York Hospital during the month of January, 1866, are given as illustrative of the application of thermometry in disease; together with an abstract of the highly interesting and elaborate paper of Dr. L. Thomas, of Leipzig, on the thermal phenomena of pneumonia. ("Ueber die Temperatur Verhaltnisse bei crouposer Pneumonie," Archiv der Heilkunde; Bd. V, S. 30–36.)

The cases are accompanied by a diagram, *fac simile* of the tables of "Vital Signs," used at the bedside to make the daily record of temperature, pulse-beats and respirations. This one only differs from ours in that on it are represented the curves for three cases, whereas usually but one case is put upon a table. No further explication of the diagram is necessary, except to state that the heat is registered in decimal parts of degrees; the pulse and respirations, of course, by whole numbers.

Two observations are found in each daily column, one in the morning made at 9.10 A. M., one for the latter part of the day made at 4.15 P. M.

For want of space the cases are much abbreviated; the physical examinations being nearly omitted. This may be justified by stating that the diagnosis in each case was verified by the attending physician, Dr. Wm. H. Draper, and that careful daily examinations were made by Dr. J. Haven Emerson, the talented house physician of the Hospital.

CASE I. G., æt. 28. Steamship fireman.

Admitted Jan. 11th, 1866. Was taken ill on 6th with chill, pain in right side, etc.

On admission, considerable febrile disturbance of rather low type; tongue much coated, inclined to dry in middle; general condition fair. Physical examination reveals dulness, bronchial breathing and voice, and crepitant rale over limits of right upper lobe; most marked in supra-spinous fossa. Expectoration characteristic. Is ordered decubitus, an oiled silk jacket, at night a Dover's powder, and

℞. Pulv. ipecac, gr. ij.
Liq. ammon. acetat., ℥iv.
M. Cap. ℥ss. q. 4. h.

Jan. 12. Consolidation progressing; expectoration thin, containing some pure blood; had epistaxis yesterday; tongue rather dryish and brown coated. Ordered, Sherry wine, ℥ vi, to be taken with milk; cont. mixt.

Jan. 15. Defervescence occurred during last twenty-four hours, with a fall of six degrees. (See table.) General bronchitis has supervened, and masks the physical signs in the affected lobe. Tongue is quite moist and cleaner. Stop mixt.

Jan. 17. Quite convalescent. Ordered, continue wine and take quinine sulph., gr. ij, t. i. d.

Jan. 27. For a week has sat up and been about. Bronchitis is gone, and he is discharged cured.

CASE II. R. S., æt. 26. Seaman.

Admitted Jan. 16th, 1866, having been ill four days. Sickness began with chill, pain in right side, fever and cough.

On admission he presents all the objective signs of pneumonia, involving the right lower lobe, in stage of red hepatization; expectoration rust-colored; general condition good. Ordered, decubitus, at night min. xv of Squibb's liq. opii co., and

℞. Pulv. ipecac, gr. ij.
" Liq. ammon. acetat., ℥iv.
M. Cap. ℥ss. q. 4. h.

An oiled silk jacket, lined with cotton, was applied over chest.

Jan. 21. Fall in evening temperature indicates the limitation of the disease. A pleuritic friction sound is heard at angle of scapula. Cont. treatment.

Jan. 23. Yesterday complete defervescence did not occur, because the inflammation extended to the upper lobe of same side; tympanitic dullness is found over angle of scapula. Defervescence did occur this A. M. Yesterday, patient had a little epistaxis and diarrhœa, which latter was checked by suppos. Opii, (gr. ij.) p. r. n. Expectoration less colored, more abundant and muco-purulent. Cont. treatment.

Jan. 24. Vital signs down to normal standard.

Jan. 31. Resolution took place rapidly; patient has been up for a few days. Some dullness remains at apex and over lower lobe, and at angle of scapula are still heard pleuritic friction sound, some subcrepitant rale and broncho-vesicular breathing.

Feb. 5. Patient is discharged, cured.

CASE III. S., æt. 19. Coal-passer on steamship.

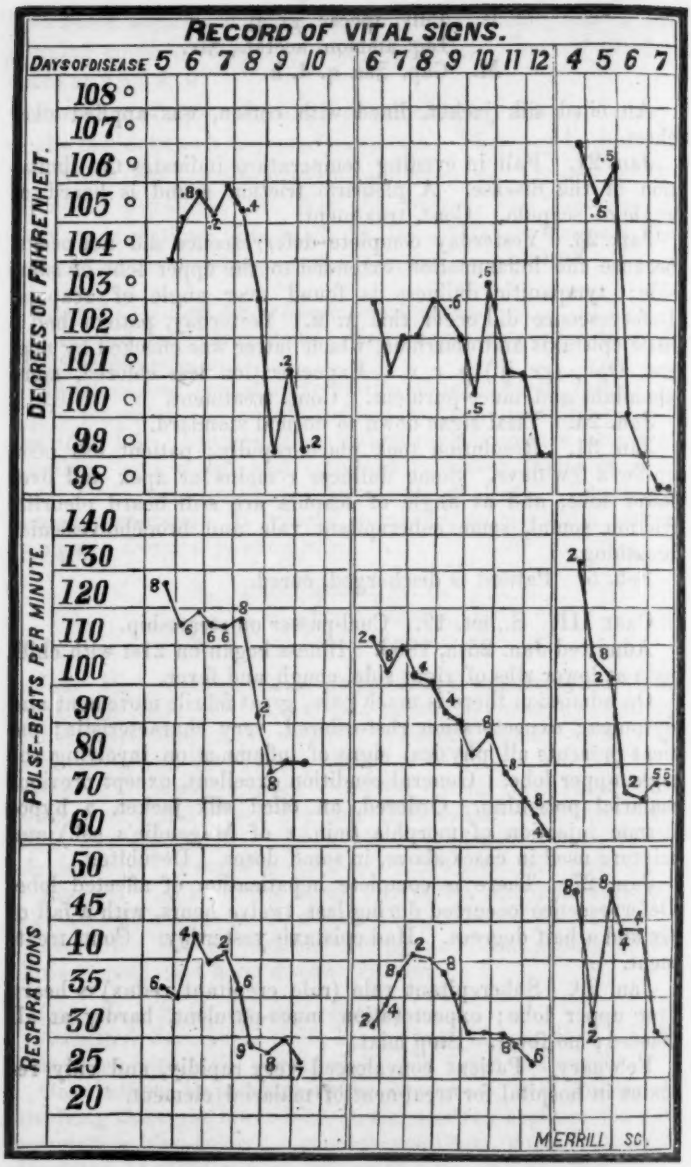
Admitted Jan. 25th, 1866. Illness began on 21st with chill, pain at lower ribs of right side, cough and fever.

On admission there is much pain, great febrile movement and dyspnœa; expectoration rust-colored, very characteristic; patient presents all physical signs of inflammation involving the right upper lobe. General condition excellent, except previous malarial poisoning. Ordered, an oiled silk jacket, a hypodermic injection of morphia (min. x of Magendie's sol.) and mixture used in cases above, in same doses. Decubitus.

Jan. 27. There is complete hepatization of affected lobe. Defervescence occurred during last twelve hours, with a fall of six and a half degrees. Had epistaxis yesterday. Cont. treatment.

Jan. 29. Subcrepitant rale (rale crepitant redux) is heard over upper lobe; expectoration muco-purulent, hardly at all colored; no fever. Stop mixt.

February. Patient convalesced very rapidly, and only remains in hospital for treatment of malarial element.


RECORD OF VITAL SIGNS.
DAYS OF DISEASE 5 6 7 8 9 10 6 7 8 9 10 11 12 4 5 6 7
DEGREES OF FAHRENHEIT.
108°
107°
106°
105°
104°
103°
102°
101°
100°
99°
98°
PULSE-BEATS PER MINUTE.
140
130
120
110
100
90
80
70
60
RESPIRATIONS
50
45
40
35
30
25
20
MERRILL SC.

In a few words these three cases may be summed up.

But first, the word "defervescence" used in these histories and in the abstract below needs definition. It is new to American medical literature, having first been used by the learned professors of the German schools, to express in one word the cessation or subsidence of the febrile phenomena of disease. It has been very recently adopted in England, and finds a prominent place, as well as the entire subject of thermometry, in Aitken's "Science and Art of Medicine."

In reading the cases and looking over the table of vital signs, the first thing to be remarked is, at what a late period of the disease the patients were received; the most recent on the fourth day. This, however, is a difficulty which attends all investigations made upon hospital subjects; but, fortunately, in other places the disease has been studied so early as to determine very conclusively that the increase of fever is rapid, and that a very high temperature may be expected within the first twelve hours. In cases I and III, which were typical of simple acute inflammation of one lobe, the temperature, high at the the beginning of the observation, continued to rise, or did not fall except in so far as the regular morning remissions were concerned, until a certain point of the disease had been reached, the ninth day in one case and the fifth in the other, and not till the ascending pathological changes had been wrought; in other words, not until hepatization of the implicated lobe was fully established. This fall in heat, pulse and respiratory movements (defervescence) was complete in case III, the thermometer never again rising above 98.° In case I, the same was true, with the exception of a single moderate elevation in the evening of the tenth day. Case II was remarkable for the low intensity of the fever. The defervescence was partially effected on the ninth and tenth days, but during the evening of the latter an alarming increase ot 3° led us to suspect that the disease had invaded a second lobe, when it will be noticed that the pulse and respirations (80 and 30 respectively) gave no warning. Physical examination showed that the thermometer was right. The next morning defervescence occurred fully, and finally in the course of two days. It may also be seen how

accurately the estimation of the heat determines the cessation of ascending pathological changes, and marks the beginning of those processes by which the vital actions restore the parts affected, and the system generally, to a state of health. That the third period of pneumonia is a resolution, is confirmed by the fact that, in normal cases, the temperature never rises above 99° after hepatization is complete. Were it true that this disease ends by a suppurative stage, the thermometer would doubtless remain high until the process was completed.

In these two points the diagnosis of disease and of complications, and reliability as an element of prognosis, lies the great value of this means of observation. To go into all the facts necessary to sustain these positions, would require more space than can be allowed to a hospital report intended simply to call attention to, and invite trial of, the matter in question. Suffice it to say, that Prof. Wunderlich, of Leipzig, has, with others, so thoroughly investigated the subject before giving it to the profession, that he made no less than half a million careful observations, and ascertained the temperature-variations of nearly all diseases so accurately, that his pupils can, by merely looking at the diagramatic record of a case, almost always correctly diagnosticate the disease without having seen the patient or heard of any other symptoms. He and many other leading physicians make constant use of the thermometer in private practice. The limited trial made in this Hospital has not at all lowered the expectations raised by reading the published accounts; in many cases a diagnosis has been arrived at, and a complication detected long before the other objective signs would have enabled us so to do. More especially are the distinctions of fevers, into the great types of typhus, typhoid, remittent and intermittent, clearly indicated and not to be mistaken. A last point urged is, that the surface heat, as measured in the axilla, is not liable to variations from the nervous, emotional causes which render the pulse and respiration so very changeable and unreliable. Being the direct result of the molecular changes produced by pyrexia, (although the precise relation of the degree of heat to the amount and proportions of the substances, resulting from retrograde metamorpho-

sis, is not yet ascertained,) it cannot be immediately affected by causes acting through the senses, which so disturb other objective signs, for instance, the sudden arrival of the physician, of a friend, of news, the movements frequently necessary to the comfort of the patient, or to facilitate examination, etc.

The whole matter of the utility of medical thermometry is founded upon the fact, that the normal temperature of the human body is invariably fixed within certain limits. Very numerous observations by competent observers have determined this. The following are those of Prof. Traube, of Berlin; the average of many studies of healthy adults at fixed periods of the day, taken in axilla:

98.24°	at 7 A. M.	
98.69°	at 10 A. M.	After breakfast.
98.65°	at 1 P. M.	
98.78°	at 5 P. M.	After dinner.
98.24°	at 7 P. M.	

As to daily practice with the thermometer, the instrument should be an accurately made one, perfect in every respect. Those used abroad (not at present to be had in this country) are graduated to fifths and tenths of degrees, and should be preferred. However, one graduated to degrees only will suffice, if greater care be exercised in reading off the mercury, and a practiced eye may even estimate one-fourth of a degree on such a scale. In all cases the thermometer should have an outer glass casing, to protect it from injury and external influences.

The bulb is to be inserted in the axilla, just beneath the fold of the pectoralis major muscle, not too deeply, the forearm of that side carried across the chest, and the elbow secured by an assistant, or by the patient's other hand. It is left *in situ*, carefully isolated from all clothing, and in perfect contact with the skin, for eight or even ten minutes, being looked at three or four times, the last two determining whether the column of mercury has ceased to rise; the degree (and fraction) is then read off and registered. While waiting, the physician has time to count and record the pulse and respirations, and even to proceed with many other points of investigation. If time be precious, the bulb may previously be heated about to the expected

heat, and then inserted, when three or five minutes will be enough for a correct estimate. With the exception of the anus, the axilla is found to be the most reliable locality for the purpose.

For further details and general information, the reader is referred to the *Archiv der Heilkunde*, of Leipzig; to Aitken's *Science and Art of Medicine*, and to articles in the London *Medical Times and Gazette*, for 1858 and 1861.

(ABSTRACT.)

Early observations:

102.5°	observed	4	hours after	first symptoms.
104.9°	"	9	"	"
104.4°	"	12	"	"
105.1°	"	23	"	"
105.8°	"	36	"	"
106.5°	"	24	"	"

Variations of temperature in regular cases:

Minimum in morning, maximum in afternoon, and again after midnight a decrease.

Types of fever:

1st. In no case purely continued.

2d. Some cases with small differences between the morning and evening measurements, (°.45 to °.5,) have very seldom been observed, and only for a single day.

3rd. In the vast majority of cases the differences amounted to °.9 to 2°.

4th. More than once differences of 2.5° have been noted.

5th. A few cases in which almost complete remissions occurred.

The *highest point of fever* may be known by an extraordinary elevation, or by a great fall in the temperature, compared with preceding observations.

The *termination of the fever* (defervescence) generally occurs within forty-eight hours, the temperature sinking to the normal standard. The *days of defervescence* have been carefully noted.

46 CASES BY THOMAS.		107 CASES BY ZIEMSSEN.	
Days.	Cases.	Days.	Cases.
2d,	2	2d,	0
3d,	6	3rd,	9
4th,	6	4th,	3
5th,	11	5th,	31
6th,	5	6th,	5
7th,	10	7th,	35
8th,	4	8th,	4
9th,	0	9th,	9
10th,	2	11th,	8
		13th,	3

Thus out of a total of 153 cases, 45 turned on the seventh day and 42 on the fifth. Ziemssen states that in cases in which more than one lobe is involved, the defervescence is likely to be put off until the eleventh or thirteenth day. Thomas is, however, inclined to doubt this, for in 18 of his cases, in which more than one lobe was affected, he observed but two in which the pyrexia did not subside by the seventh day; and those on the tenth.

Defervescence is affected by the lobes involved as follows:

Right upper lobe—1 on second day; 4 on seventh; 1 on eighth.
Right lower lobe—2 on fourth; 4 on fifth; 2 on sixth; 1 each on seventh, eighth and tenth.
Left lower lobe—1 on second; 5 on third; 2 on fourth; 6 on fifth; 1 on eighth.

Temperature towards fatal termination.

Majority of cases ending in delirium:

2 on sixth day, 106.5° and 105.6.°
1 on seventh, 109.4.°
2 on eighth, 106.4° and 104.9.°
1 on fourteenth, 108.9.°

In one case ending with furious delirium, hallucinations, trismus and tetanus, an elevation of 6.9° occurred in six hours. In three cases dying of suffocation, (asthenia and apnœa,) there was no elevation toward the agony; in two there was great emphysema, and the temperature remained between 101.3° and 103.5°; in the third, accompanied by a fever of great regular remissions, the last estimate was 99.5.°

Clinical Lectures on Diseases of the Eye. By E. L. HOLMES, M. D., Lecturer on Diseases of the Eye in Rush Medical College, and Surgeon to the Chicago Charitable Eye and Ear Infirmary.

MYDRIASIS, MYOSIS, SPASM AND PARALYSIS OF THE ACCOMMODATIVE MUSCLE AND ASTIGMATISM.

GENTLEMEN,—Mydriasis is characterized by a marked dilation of the pupil, without any apparent abnormal changes in the tissues of the eye. In typical cases, the pupil of one or of each eye becomes dilated to such an extent, that the iris is scarcely perceived behind the limbus conjunctivæ. Sometimes the dilated pupil is oval or irregular; it is almost entirely if not quite uninfluenced by the strongest light, or by fixing the eyes upon near objects. Mydriasis is often, perhaps usually, accompanied by paralysis of the ciliary muscle, so that the eye cannot accommodate its focus for vision of near objects. In some cases the ciliary muscle is unaffected, as can be shown by placing an aperture in a thin disc of metal before the pupil, to exclude the undue amount of light which enters the dilated pupil, when it will be found that the eye can see near objects as well as distant objects. The affection is usually confined to one eye. To such an eye, objects often seem smaller than they really are. This apparent diminution in the size of objects, the dazzling caused by too much light entering the eye, and usually the inequality in the foci of the two eyes, produce the chief inconvenience of this disease. The causes of mydriasis are often so obscure, as to evade the most careful scrutiny.

Paralysis of the branches of the third pair of nerves which supply the annular fibres of the iris, or irritation of the sympathetic nerves, which supply the radiating muscles, may produce the disease. In these cases the primary cause may be masturbation, irritation of the bowels from the presence of worms or crude substances. Belladonna and other drugs taken internally or applied near the eye produce, as you well know, dilation of the pupil. The diagnosis between mydriasis, produced by belladonna and that caused by other agents, is not only difficult but sometimes impossible. Malingering soldiers, who have been taught the effects of atropine, may long keep up

deception if they are cunning enough to conceal the drug from their surgeons. Soldiers have been known, for instance, to conceal some form of belladonna under the toe-nail, or in a small tube attached to a thread and introduced into the rectum.

The prognosis in cases of mydriasis is generally favorable.

In regard to treatment there is but little to be said with certainty.

It is of great importance to seek the cause and endeavor to remove it.

Extract of calabar bean has been in some cases known to act favorably in causing the pupil to contract. In other cases it has proved inert.

From the fact that the pupil contracts from irritation of the fifth pair of nerves, as in certain ulcerations of the cornea, or when foreign substances are introduced under the lids, some practitioners have been led to produce minute ulcerations artificially, by the application of solid nitrate of silver to the conjunctiva near the cornea. Occasionally, this plan has seemed successful.

Electricity, strychnia, ergot, methodical exercise of the internal recti muscles, in fixing the eyes upon near objects, have been found beneficial.

Myosis is that condition of the eye, in which the pupil remains for a greater or less period abnormally contracted, without apparent change in the internal structures of the eye. The pupil may be exceedingly minute, and almost wholly uninfluenced by atropine, or by absence of light. As little light can enter the pupil, the impression on the retina is diminished, and objects appear less brilliant than when the pupil is of its normal size.

Irritation of the third pair of nerves, paralysis of the sympathetic branches of the iris, habitual use of the eyes upon near objects, as with jewelers and engravers, constipation, tumors in the neck pressing upon the sympathetic nerve, have been recognized as causes of myosis. The exact condition of the accommodative apparatus has not been accurately determined.

You are well aware that the calabar bean has been found,

when applied to the healthy eye, to produce extreme contraction of the pupil, and also to render the eye myopic.

The treatment of this disease consists almost entirely in removing its cause. Atropine is almost useless.

If the contraction is excessive and other treatment hopeless, the operation for artificial pupil is indicated.

Paralysis of the ciliary muscle is characterized by the impossibility of accommodating the eyes for near objects. The distance, however, at which objects can be seen, will be different in different eyes, according as they are short-sighted or hypermetropic. The paralysis may be partial or total, and usually depends upon diseases of the brain or spinal cord, upon uræmia, diabetes, lead poison and excessive use of alcohol. It is usually attended with dilatation of the pupil.

The influence of belladonna in producing paralysis of the accommodative muscle, has already been described in a previous lecture. The treatment of this disease must be conducted upon the same general principles which guide us in the management of other forms of paralysis. Much had been expected from calabar bean, although little has been really accomplished by the remedy.

Spasm of the ciliary muscle produces an effect just contrary to that of paralysis. The accommodative apparatus is spasmodically adjusted for the nearest object it is capable of seeing distinctly. This is often a result of irritation of the cornea and conjunctiva, as in certain forms of inflammation, and is accompanied with spasm of the orbicularis and of the annular fibres of the iris, and with photophobia. Occasionally it is observed without these symptoms.

The treatment of this affliction is often unsatisfactory. If possible, irritation should be removed. Exercise of the eye with the use of convex lenses, is sometimes of benefit. Since a convex lens placed before the eye, when adjusted for near objects, tends to bring the focus of the rays of light in front of the retina, there will be an effort on the part of the adjusting apparatus to overcome the effects of the conevx lens, by flattening the crystalline lens. This can only be accomplished by a relaxation of the ciliary muscle. Belladonna

tends to overcome this spasm, but is often employed without any good results.

Mydriasis, myosis, paralysis and spasm of the ciliary muscle, are comparatively rare diseases. I have merely alluded to the principal facts connected with them, because they may occasionally come to your notice, and especially because these pathological conditions serve to enlighten us very materially in reference to the physiology of accommodation.

The older ophthalmologists were in great doubt regarding the power of accommodation. Many believed it depended upon the action of the recti muscles.

We have seen that paralysis of the accommodative apparatus, whether idiopathic or caused by belladonna, spasm of the accommodative apparatus, whether idiopathic or caused by calabar bean, produce respectively such changes that the eye is adjusted to distant or near objects only—the muscular fibres are unable either to contract or relax respectively. There is an analogy between these two conditions, and paralysis and spasm of the flexor muscles of the limbs. These different pathological conditions of the adjusting apparatus may exist, and yet the recti muscles may rotate the eyes as freely as in perfect health, showing that accommodation is independent of the recti muscles. You remember that I called your attention in a previous letter to the fact, that total paralysis of the recti muscles could exist without destroying the power of accommodation.

Astigmatism. In the normal eye the surfaces of the cornea and crystalline lens possess almost absolutely the same convexity in their horizontal, perpendicular and intermediate diameters, (Meridians.)

In certain cases the cornea, and less frequently the lens, is much more convex in one diameter than it is in another. This condition is termed *astigmatism.* The surface of the cornea is ellipsoidal. It was quite well described years ago. Donders and others, however, have investigated the subject more fully. We now find it embraces quite a long and interesting chapter in ophthalmology. When astigmatism exists in a marked degree, there is great indistinctness of vision. A square or a circle will appear respectively oblong or elliptical. As you can

readily understand, if the eye is adjusted in such a way that the most convex portion of the cornea causes the rays to come to a focus *on* the retina, the less convex portion must come to a focus *behind* the retina. Hence, there will be this form of distortion in the appearance of objects, as, for instance, a square: The two opposite sides will appear parallel and quite distinct, while the other two sides will be ill-defined and irregular.

To such a degree are some eyes astigmatic, that a luminous point appears as a line.

The diagnosis of this condition of the eye usually rests upon the following modes of examination: The patient should be directed to look at some suitable object, such as a white square or circle on a dark ground, placed at a convenient distance. The character of the distortion will lead one to suspect the presence or absence of astigmatism.

If a thin disc of metal, in the centre of which a very narrow slit not more than one-half a line in length is made, be placed close to the cornea, it will be found, on looking through this opening and rotating it, that there will be a certain position of this opening in which vision will be most distinct, and when turned 90° further, vision will be most indistinct.

An examination with the ophthalmoscope is of service in the diagnosis of this deformity, since the rays of light, on passing through the astigmatic cornea, changes the apparent form of optic papilla from that of a circle to that of an ellipse. It should, however, be remembered, that the papilla is sometimes found elliptical in health.

Astigmatism may be congenital or acquired. It is usually most apparent in the cornea, although it may be found in the lens.

The causes of acquired astigmatism are chiefly ulcerations and injuries of the cornea, which on healing produce contraction of the tissues and consequent inequalities of curvature.

The extraction of cataract is sometimes followed by sloughing of the cornea. Cicatrization often results in more or less differences of curvature.

The treatment of astigmatism consists almost entirely in the use of concave or convex cylindrical lenses. By means of these

lenses vision may be very much improved, and in favorable cases even restored to normal distinctness.

The lenses are most applicable in regular astigmatism, where the surface is ellipsoidal. In irregular astigmatism, where the cornea is, for instance, conical, or where its surface has a curvature similar to the surface of an egg, divided parallel to its long diameter, they will, at best, but partially improve vision.

The Pathology and Treatment of Cholera. By HENRY M. LYMAN, M. D., Pathologist to the Cook County Hospital.

(Read before the Chicago Medical Society, March 30, 1866.)

In this essay I can claim nothing that is new. Resulting from an independent effort to examine the phenomena of cholera in the light of physiology and pathology, I am not surprised, but am pleased to find that my conclusions have been anticipated by others, to whose writings my attention has been directed since the completion of this study. "There is nothing new that is good; nothing good that is new."

For the sake of clearness in argument, I shall assume that the symptoms of cholera are produced by the action of a positive agent which operates in the blood, vitiating its fluid portion and exciting the system through the fibres of the ganglionic nerves, to an effort for the elimination of the intrusive poison.

That cholera is essentially a disease which consists in contamination of the blood, seems to be indicated by all its symptoms. Vomiting, purging, sweating, cramps, collapse and reaction are phenomena characteristic of elimination, whether they be caused by an over-dose of podophyllin, or by a draught of cholera poison. These are not vague and purposeless efforts, but are possessed of a significance that is most instructive.*

* The analogy which exists between the phenomena of all diseases should also be kept in mind. In pneumonia the exudation which is poured into the air-cells affords vital relief by emptying the distended capillaries. The mechanical difficulties which grow out of this exudation are probably less prejudicial than the consequences which would be manifested, were exudation from the vessels during inflammation rendered impossible by any cause.

I think we need not hesitate to affirm the proposition that the symptoms of cholera are caused by the violent efforts of the system to rid itself as speedily and as effectually as possible of the fluid portion of the blood.* In addition to the phenomena occasioned by this eliminative effort, must be reckoned the secondary and consecutive phenomena arising from an arrest of the functions of nutrition, secretion and excretion, which is unavoidable under the conditions most favorable to such an extraordinary method of elimination.

Prof. N. S. Davis has fully shown how caloric acts as a predisposing cause of watery effusions from the blood, by depressing the integral vitality of the tissues, and by producing a general laxity highly favorable to perspiration and to intestinal flux. The action of caloric alone, however, will not suffice to produce the disease in question. In cholera morbus, bilious diarrhœa and Asiatic cholera, the symptoms of the disease do not manifest themselves until the blood has become vitiated by the introduction of some foreign agent, and by the retention of excrementitious substances. To eliminate this *materies morbi* is, then, the effort of nature; and the manner in which the process is effected, is an evidence of the wonderful skill with which the animal organization is contrived. A temporary derangement of the circulation is made the means of purifying the blood. In a state of health the tonicity of the blood-vessels is maintained, and their calibre is regulated by the action of the branches of the ganglionic nerves which are distributed to their walls. Under the influence of the depressing causes which, during the prevalence of certain atmospheric conditions, tend to diminish the integral vitality of all parts of the system, these ganglionic nerves undoubtedly suffer with the rest of the tissues. Now it is well known that debility is the parent of morbid susceptibility and morbid irritability. During health the passage of healthy blood excites these nerves to a degree that influences the walls of the blood-vessels sufficiently to maintain that degree of tonicity which

* That the poison resides in the serum, is rendered probable by the fact that it is the watery portion of the blood rather than its solid constituents, which is ejected from the system. In yellow fever the red globules are affected, as appears from the amount of hematoidine in the evacuations.

is most subservient to healthy circulation. But when, as a consequence of the impaired nutrition, secretion and excretion which result from a diminution of integral vitality, or when, as a consequence of the intrusion of a poison from without, the blood becomes vitiated, it fails to communicate to the ganglionic nerves that healthy stimulus which is essential to the proper calibre of the blood-vessels. Subsequent phenomena indicate that one result of this morbid irritation is a spasmodic action of the muscular coat of the smaller ramifications of the blood-vessels,—a condition of which the effect is naturally more conspicuous in the arterioles than in the veinules, because of the superior muscular organization of the arteries. That this spasmodic muscular action is perfectly compatible with debility, is proved by the powerful muscular contractions which occur in cholera and in tetanus, in delirium tremens, and in many other diseases where vitality is at the lowest ebb. In addition to this, in cholera the vigor of the heart is diminished by the failure of the innervation derived from the pneumogastric nerve, a circumstance which is proved by the loss of the voice, and the acceleration of the movements of the heart which occur during the disease;—precisely the effects produced by section of the pneumogastric nerve at its origin.

Having then a condition characterized by arterial debility with consequent irritability and diminished cardiac vigor, the blood is forced with less power from the heart, so that it moves in smaller quantity from the right to the left side of the heart, and the venous system becomes unusually gorged with blood. When this derangement is not excessive, the over-loaded veins of the bowels obtain relief by moderate exudation into the alimentary canal. This is the stage of diarrhœa, known, in the absence of specific causes, as bilious diarrhœa. When the system is laboring under the influence of cholera poison, this stage of the disease is known as *cholerine*. It is essentially a recuperative effort, and tends to promote the relief of the patient. But when the amount or the intensity of the poison is too great for elimination by this gentle process, more violent measures become necessary. Responding to the increased irritation produced by the circulation of vitiated blood, the arterioles urge

on the blood more effectually, while the heart, more completely deprived of the influence of the pneumogastric nerves, and depressed by over-distention, beats more frequently and with less vigor. The veins are not emptied as they should be in health, partly because of the diminished strength of the heart, and partly because the current of blood is materially obstructed in its passage to the lungs. That this is not a mere matter of theory, is shown by examination of the bodies of those who die of cholera before the stage of reaction occurs.* The system seems intolerant of the blood, and refusing to receive it, attempts to confine the fluid within the venous cavities, where, physically speaking, it is the farthest removed from the tissues of the body. At the same time so greatly is vitality depressed, that the walls of the venous capillaries and venules can no longer resist the pressure of their contents, and the watery portion of the blood is poured forth upon the surfaces within and without the body. Extending its influence to the spinal nerves, the morbific agent excites muscular contractions which serve to force towards the central cavities, the blood from the deeper and more distant portions, where it would otherwise linger in the capillaries and more certainly poison the system.† Contraction of a kindred nature occasions the expulsion of the fluids that are poured into the alimentary canal. Hence, the vomiting, purging, sweating and cramping which characterize this stage of the disease. At the same time the functions of the liver and kidneys are impeded; not because their continuance would be prejudicial, but because, having been designed for the performance of certain functions under the ordinary conditions of health, it is mechanically impossible for these organs to continue their operations under those conditions

*The lungs are so bloodless that Dr. Metcalfe, of New York, regards this as the cause of the coldness of the breath of a patient in collapse. This is partly true, but the principal cause of the diminution of temperature is to be found in the suspension of cell-activity throughout the system, which occurs in the presence of the poison which causes the disease. As soon as this poison has been sufficiently eliminated, the cells resume their activity, and the temperature of the body rises, even for a considerable time after the death of the patient.

†This statement accords with the current opinion relative to the production of muscular motion. The more rational views of the causation of muscular action, advanced by C. B. Radcliffe in his lectures on pain, paralysis and epilepsy, serve to explain the phenomena of cramp in cholera in a manner much more consonant with the ideas which have been proposed above. He has shown that convulsions, cramps, and muscular motion in general, can be produced by impeding the supply of arterial blood, by the circulation of vitiated blo d, (which is equivalent to the arrest of arterial supply,) and by a diminution of nervous influence;—three conditions which are present in cholera.

of intense venous congestion which are most favorable to the speedy elimination of the cholera poison. As the effect of this agent becomes more fully developed, the exclusion of the blood from the tissues is made more perfect by the more violent operation of the causes which have been described. The patient becomes livid, pulseless, shrivelled, collapsed. The blood can with difficulty reach the lungs, and the small quantity which finds its way to the left side of the heart is hurried back into the venous cavities, where it is least innocuous to the system. Thus the venous pressure is maintained until a sufficient portion of the vitiated fluid has been ejected from the body. If the vital powers of the system have been too far overcome in this process, death may occur at this stage; but if the vitality of the tissues still remains, reaction now begins, and its progress and completeness depend, not only upon the degree of unimpaired energy, but upon the extent of the injury which may have resulted from the accumulation of excrementitious matters during the suspension of the hepatic and renal functions. Relieved in great measure of the irritating fluids which have excited arterial spasm, the heart receives new innervation from the pneumogastric nerves, and the walls of the arterioles become relaxed even beyond their natural calibre. Circulation is restored; the veins are emptied sufficiently to arrest the morbid transudation of their contents; secretion is renewed, and recovery commences. The subsequent fevers, congestions and inflammations which so often delay or prevent recovery after the establishment of reaction, are only the natural consequences of the mechanical violence to which the system has been subjected by the choleraic paroxysm, associated with imperfect or excessive reaction, and the impaired nutrition resulting from the vitiated condition of the blood. These sequelæ of the disease need not be considered any farther in this connection.

Such then, is the theory of cholera. In opposition to this theory are urged two objections, which at first might seem to carry some weight, but which are easily set aside by a reference to the teachings of physiology.

Against the theory of a poison acting through the watery

portion of the blood it is objected that, if the vitiation of this fluid is the cause of the disease, and if the poison is really eliminated by the evacuations which occur, the severity of the symptoms of the disease should steadily decline from the commencement of the evacuations. Now we have through the whole argument assumed that the manifestations of the disease are produced through the immediate effect of the poison upon the ganglionic nerves; and as it is an established fact that "the effects of stimulation or irritation of this system are not instantaneously manifested, as is the case in the cerebro-spinal system, but are developed slowly and gradually," a little reflection will obviate the difficulties which at first sight are presented by the spectacle of a proximate cause acting with increasing energy, while the remote cause is becoming continually more inert.

The second objection is still more weighty, though far from conclusive. It is urged that the phenomena of collapse are due to an arrest of the circulation in consequence of the viscidity of the blood, which has been drained of its watery portion, and that these phenomena cannot be attributed to spasm of the pulmonary arterioles, because there is not a degree of dyspnœa sufficient to warrant a belief in the existence of any pulmonary obstruction. Now collapse is not simply the result of impeded circulation, else it would not differ from syncope. It results from a depression of the vitality of the system, combined with an arrest of the circulation. The specific consequences of such an arrest would be the same, whatever its cause; and were it not for its relation to the plan of treatment, the exact nature of the impediment which undoubtedly exists would be a matter of no importance. That simple viscidity is not the cause of the impeded circulation, is rendered clear by the fact that after reaction has taken place, the blood moves without difficulty, even before its volume has been restored; nor can the sudden occurrence of the collapse which occasionally supervenes before the manifestation of other grave symptoms be explained by the supposition of a morbid viscidity of the blood. In cases of this class there is little evacuation; collapse is suddenly declared; the patient experiences a want of

air, and suffers indescribable agony; death speedily closes the scene, while the blood is still fluid, before the strength has been exhausted by suffering and evacuation. These phenomena bear a striking resemblance to the phenomena which follow the admission of air into the right side of the heart,—an accident which produces distress and speedy death by a mechanical impediment to the passage of blood from the right ventricle to the pulmonary capillaries.

As for the dyspnœa which some think should result from such an obstruction to the current of the blood, it is sufficient to remember that the phenomena of asphyxia are due to a cessation of the supply of oxygen to organized tissues in which the processes of nutrition are still active. Whenever the processes of nutrition are partially suspended, the supply of oxygen may be almost entirely cut off, without exciting that distress which would be felt as a consequence of such an arrest during a state of health. The following experiment performed by Bernard, illustrates this proposition: "A sparrow was confined under a bell-glass for one hour and a half, at the end of which time another was introduced; the first being still comparatively vigorous. The second became instantly much distressed, and died in five minutes; but ten minutes after, the sparrow which had been confined for more than an hour and a half, was released, and flew away." The bird which was first imprisoned, gradually poisoned the air of the receiver, by absorbing oxygen and exhaling carbonic acid gas. By this process the oxygenation of the blood was progressively hindered, yet no symptoms of distress were manifested, because the processes of nutrition were by inhalation of a poisonous atmosphere, correspondingly depressed to such a degree, that the demand for oxygen in the system was insufficient to excite that *besoin de respirer* which was immediately manifested by the second bird, in whose tissues, integral vitality being unimpaired, the processes of nutrition were so slightly depresssed, that the demand for oxygen was greater than could be supplied from the vitiated atmosphere of the receiver. Hence, the symptoms of distress and the speedy dissolution of the stronger and healthier bird—actually de-

stroyed by its own superior vitality.* Now the condition of a cholera patient is very similar to the condition of the bird under a receiver. Gradually deprived of blood through the diminution of the arterial current, and depressed by the overwhelming influence of the cause of the disease, the processes of nutrition are impeded, and the demand for oxygen in the tissues is so slight, that when collapse finally occurs, the only symptoms of asphyxia are sighing, yawning, or a trifling degree of dyspnœa, instead of those symptoms of acute distress, faintness and want of air which attend collapse when it ushers in the disease. The same facts were presented in the case of a patient who recently died of pyæmia, at the County Hospital. In that case the liver exhibited a marked degree of superficial paleness, but, on section, black blood poured from its cavities as freely as if the incision had been carried through living flesh. On opening the thorax, the anæmic condition of the lungs was so remarkable that I expected to find some obstruction to the passage of blood between the liver and the lungs. Section of the heart revealed a sufficient obstruction in the shape of a firm straw-colored clot which filled the right side of the organ, and extended to the ultimate ramifications of the pulmonary artery.† Here was a condition producing appearances analogous to those which characterize the morbid anatomy of cholera during the stages previous to reaction: there was impeded circulation of the vitiated blood, leading to its confinement in the venous cavities, and producing the diarrhœa and sweating which serve to eliminate the *materies morbi*, yet none of the acute distress which would have been inevitable had the processes of nutrition been creating in the tissues a constant demand for oxygenated blood.

It has then been shown that the symptoms of cholera indicate a condition in which the system labors under the effects of a poison which is contained in the watery portion of the blood; that the efforts of nature are directed to the exclusion of this

* Does not this explanation hint at one of the causes of the greater mortality which attends the outbreak of all epidemics of dangerous disease?

† In this case the bloodless appearance of the lungs as they were exposed *in situ* was very remarkable, yet the obstruction was not sufficient to prevent the occurrence of considerable hypostatic congestion. May we not in this way reconcile some of the conflicting statements respecting the condition of the lungs after death in collapse?

vitiated fluid from the tissues, and to the ejection of its poisonous constituents from the body; that the arrest of secretion and the retention of excrementitious matters, are the inevitable result of that derangement of the circulation which is most favorable to the forcible and speedy purification of the blood; and also, that the absence of certain phenomena does not contradict this view, but is really owing to that serious depression of the integral vitality of the tissues which is the true source of danger in the disease. In accordance with this theory, the indications for treatment are: 1st, to administer an antidote to the poison that causes the disease; 2d, to sustain the integral vitality of the system; 3rd, to favor the evacuation of the poisonous constituents of the blood; and 4th, to supply the means for a restoration of a healthy circulation. The antidote to the poison of cholera remains for future discovery, so we must reluctantly forego this branch of the treatment. The attempt to sustain the vital energies of the patient next engages our attention. You are all sufficiently familiar with the methods which are commonly employed for this purpose. I shall in this connection only advert to the use of stimulants, which usually constitutes the chief reliance in efforts to sustain vitality. Since the prostration of cholera consists in the depression of vitality which results from the circulation of poisoned blood, and since the collapse of the disease consists in this depression, with the added effects of an impeded circulation, the condition of the patient is widely removed from that state of syncope which is the result of a temporary debility of the heart. In syncope the blood and the tissues are healthy,—all that is needed is the power of propulsion from the heart. This is furnished by stimulants, and may be sustained by them until the full measure of cardiac vigor is restored. But when the vitality of the tissues is overwhelmed by contact with poisonous blood, an agent which serves not to purify that blood, but only to increase the freedom of its supply by spurring the circulation, cannot fail to be injurious. Alcoholic stimulants, moreover, have the fatal property of diminishing the activity of the processes of disintegration and nutrition, processes which in cholera are already at their lowest ebb. Hence, we should anticipate that the use of diffusable

stimulants must be injurious in this disease, and experience fully justifies the anticipation. But, if we possess any agents which can support the vitality of the tissues without too much acceleration of the circulation, their use will be found beneficial.*

The next indication is to favor the evacuation of the poisonous constituents of the blood. This does not at all imply the acceptance of the doctrine, that like cures like, requiring the use of purgatives and emetics. The duty of the physician consists in rightly interpreting the efforts of nature, and in placing the patient under those conditions most favorable to the unimpeded activity of his own natural powers. Hence, it is as important to know what to avoid as to know what to do. It is in the preliminary stages of the disease as important to keep in view the elimination of the poison, as it ever can be in the later stages. While restraining the diarrhœa, which is only dangerous because of its tendencies, we shall not contribute to the safety of the patient if we neglect to promote the activity of the skin, the kidneys and the liver. Hence, the advantage gained by the use of an intestinal astringent like sulphuric acid, which increases the activity of the kidneys, especially when combined with diuretics and with diaphoretics. In the successive stages of the disease this consideration should deter us from the use of those astringents which simply prevent the escape of the fluids of the blood. The worst cases are by no means those which are characterized by the most copious evacuations. It will not often be necessary to use evacuant remedies, but when collapse occurs suddenly without any antecedent discharge, diaphoretics, emetics and even purgatives are required. So long as we have no antidote to the poison, nothing can be more calculated to endanger the safety of the patient than an attempt to oppose its elimination from the system; consequently, when the processes by which the blood is ordinarily purified are necessarily suspended, the attempt to arrest purging by the use of opium and astringent remedies can, if

* The good effects of *small* doses of laudanum in collapse are well known, and explain the success which has attended the use of the celebrated cholera mixture employed in Constantinople.

successful, only add to the dangers which surround the sufferer.* The use of calomel is defended on the ground that it is the most powerful agent which can be employed to increase the discharge of bile. True enough, and its use is indicated in the earlier stages of the disease before the appearance of alarming symptoms, while there is only inactivity of the hepatic function. But when the liver has become so deeply engorged with blood that secretion is difficult if not impossible, what benefit can accrue from the use of such an agent? Depletion is needed to restore secretion in this stage. Good results have without doubt sometimes followed the administration of calomel during the stage of prostration, but they seem to have been confined to that diminution of gastric irritability which results from the local effects of the drug upon the mucous surface of the stomach. Moreover, when the chief reliance has been placed upon this remedy, its use has often prevented that resort to astringents and stimulants which would have so greatly increased the chances against the patient.

What then shall be done by the physician?

In the first place the patient should be placed in bed, to procure that equalization of the circulation which is favored by the warmth of the couch, and is most favorable to the action of the secernent glands. As remedial agents, there can be nothing better in the stage of cholerine than the mildest of mercurials, alternated with the sulphuric acid lemonade. But if the disease advance to the stage of prostration which threatens collapse, mercurials, astringents and opiates should be abandoned. We must now favor evacuation, relieve pain, and control the circulation. Give one large dose of castor oil, to remove all offensive matter from the bowels, and if there is great distress and prostration without evacuation, give soda powders, largely diluted, to prevent irritation, which, by the action of their saline ingredients, will serve to provoke the discharge of water from

* This is disputed by some who assert that the more active the vomiting and purging in a case of cholera, the more certainly fatal will be the result. Yes, if the ordinary treatment is conducted with an activity proportioned to the urgency of these symptoms; for, as I have shown, the danger of the patient is proportioned to the degree of success which attends the hindrance of these vicarious processes of elimination, and it is in precisely this class of cases that the largest doses of opium, acetate of lead, etc., followed by the most copious libations of brandy, are usually employed.

the blood, and by their effervescence will tend to allay the irritability of the gastric surfaces. If perspiration is deficient, give warm mint-tea containing a drachm or two of sulphuric ether. To relieve dyspnœa, to allay the pain occasioned by muscular cramp, and to overcome that irritability for which opium is usually administered, give chloroform by inhalation and by the mouth. The effect of chloroform must be very carefully watched, because, if carried too far, the brain will become congested, the blood will become still more deprived of oxygen, and by excessive relaxation of the pulmonary arterioles, combined with the stimulation of the heart, which is one of the primary effects of chloroform, too great a supply of vitiated blood may be discharged upon the tissues, which are already in peril from contact with the poisonous fluid. Chloroform will be most serviceable when collapse comes on early, (as the result in great measure of mechanical impediment to the pulmonary circulation,) before the vitality of the tissues has been so far depressed that they feel but slightly the need of oxygen to sustain the processes of nutrition. In this stage the patient will be relieved by chloroform, very much as a criminal, half-strangled by a hangman's cord, is relieved by the knife which severs the noose around his neck. Chloroform may relieve, but unfortunately, it cannot cure, for the blood of the cholera patient contains a poison which will destroy the life of the tissues, and which can neither be neutralized nor eliminated by agents like chloroform, bleeding, tartar emetic, etc., which simply relax spasm or allay irritation. All these agents have been found useful, but, except so far as they favor evacuation, their good effects are restricted to the single property of controlling spasm and irritability. Their secondary effects are useless if not positively injurious, and their employment should be restricted to those cases where the phenomena which result from impeded circulation, have with them associated a degree of dyspnœa and distress which indicates that the vitality of the tissues is not yet so far overpowered that the want of oxygen is no longer experienced by the system. When vitality has ebbed so low that the cessation of the pulse awakens no responsive respiratory effort, the use of chloroform will be at-

tended with more danger than accrues from bleeding and tartar emetic.

But in this stage, when collapse follows the season of prostration in the ordinary course of the disease, these active agents should seldom be employed. The stage of collapse is a recuperative stage. It is not syncope, but, like the syncope which saves the wounded man by arresting hemorrhage, its design is to save by relieving as far as possible the enfeebled system from contact with the poison which still remains. It is not so much the result of diminished fluidity of the blood, as it is the result of an intolerance of that blood by the system. Hence, our treatment in this stage must tend as little as possible to perturb the operations of nature. Stimulants and astringents are contra-indicated, for the reasons which have been already detailed; opiates, for the same reason, as well as for their tendency to promote cerebral congestion and the retention of excrementitious substances in the blood. Chloroform and tartar emetic are too dangerous. Bleeding may prove beneficial by still farther evacuation of the poisonous agent, and by adding vigor to the heart through depletion of its cavities, but it is liable to the risk of adding syncope to collapse. There remains then little to do but to persist in carrying out the fourth indication for treatment, viz: to supply the materials for the restoration of a healthy circulation. Considering again the nature of the evacuations in cholera, we find that they consist chiefly of the water of the blood. This is discharged from the capillaries, and is recruited from the fluids of the body, occasioning that frightful emaciation so characteristic of the disease, and producing the fearful thirst which consumes the patient. Here is the plainest indication for treatment: Give water freely. The greater portion will be vomited, but some will be retained, and by the process of endosmosis will enter the veins to replace the ejected serum.* During the earlier stages of the process of evacuation, the exosmosis of the serous portion of the blood will be favored by the administration of water, in which is dissolved a quantity of salt somewhat exceed-

*Water should be imbibed slowly, to avoid the tumultuous discharges which may result from suddenly overloading the stomach with large draughts of fluid. Hence the advantage of sucking ice.

ing the proportion of the saline constituents of the blood. During the later stages of the disease, when the blood has been largely drained of its water, and when, consequently, its replenishment is desirable, endosmosis should be favored by the administration of water containing a smaller proportion of saline ingredients than exist in the blood. In this way the renewal of the blood will be promoted in a manner far less dangerous than by the method of injecting saline solutions into the veins. As soon as reaction commences, cups should be applied to assist in relieving the engorgement of the kidneys and the liver, and as soon as urine begins to flow, the elimination of urea from the blood must be encouraged. The hepatic secretion will soon be re-established, and the patient may be cared for in accordance with the general principles which govern the treatment of the various conditions which grow out of the different forms of reaction.

Such, then, is the theory of the pathology and treatment of cholera, derived from a consideration of its symptoms and its morbid appearances. I have said little about the accessories of treatment, such as sinapisms, foot baths, friction, ice, vapor baths, warm baths, etc., because the limits of this paper restrict one to the leading features of the disease and of its treatment, and for the same reason I have not touched upon the pregnant subject of prophylaxis. If we entertain a clear view of the pathology of the disease, we shall at least know how to avoid whatever tends to harm the patient; and while we remain destitute of remedies antidotal to the cause of the disease, the best we can do in our treatment will be, to remove as many as possible of the impediments which hinder the recuperative efforts of nature, while we endeavor to sustain the powers of the sufferer. The mortality of cholera will always be large, and the percentage of deaths will always be greater at the commencement of an epidemic than towards its close, from the fact that those persons whose livers and kidneys have been damaged by previous disease, are, by consequence, pre-eminently susceptible to the invasion of cholera, and are especially liable to fatal complications during its course. If, recognizing these facts, we shall, without wavering or discouragement, continue to apply

that treatment which is founded upon the established principles of physiology and pathology, we may confidently expect to see a great reduction in the general average mortality resulting from this terrible pestilence.

Since the completion of the *a priori* argument contained in the preceding pages, my friend, Dr. Marguerat, has placed in my hands the following statistics, from the hospitals of London, Paris and Vienna, which serve to illustrate the practical working of the different theories which have been formed for the guidance of the physician in cholera:

TREATMENT AND MORTALITY OF CHOLERA.

TREATMENT.	Cases.	Deaths.	Per ct.
Venous injection,..	90	78	85.7
STIMULANTS.			
Brandy, ammonia, turpentine, cajeput oil, etc.,	3055	1792	58.8
Ditto with ipecac emetics,	37	25	67.
Ditto with calomel and opium,	356	214	60.
Ditto with ice,	58	29	50.
Opium,	81	47	58.
Calomel and opium,	196	112	57.14
Calomel,	376	147	36.59
Bleeding, with calomel, opium and antiphlogistics,	285	168	59.
EMETICS.			
Ipecac,	21	12	57.
Ditto with stimulants,	37	25	67.
Ditto with bleeding and quinine,	161	81	50.
Ditto with bleeding alone,	222	104	47.
Ditto with moderate warmth,	281	98	34.9
Salt with cold water,*	607	112	20.
Tartar emetic,	21	4	19.
Ice with stimulants,	58	29	50.
Ice alone,	142	43	30.
SALINES.			
Greville St. Hospital combination of salts,†	107	15	14.
Dr. Stevens' combination of salts,	88	67	76.3
MISCELLANEOUS,	17	8	47.6
Total,	6296	3210	51.

London Medical Times, vol. 19, p. 106.

* The salt emetic treatment consisted in the administration of about two tablespoonfuls of common salt in from four to eight ounces of cold water, every quarter of an hour, until vomiting is produced; then cold water in large draughts.

† The saline treatment consisted in the administration, every quarter of an hour, of sodæ carb. scr. ij, sodii chlorid. dr. ij, potass. chlorat. gr. viij, aquæ q. s. pro. haust. The patient was also placed in a hot saline bath, at 120 degrees, in which 14 lbs. of salt were dissolved. Cold water was drank *ad libitum*. See "The Medical Times," vol. 19, p. 89.

In reviewing these figures, it should not be forgotten that the mortality in private practice is much less than it is in public hospitals, to which are carried the worst cases from the dregs of the population. Keeping this fact in mind, one cannot fail to perceive that the tendencies of the disease are to recovery. The most unfavorable circumstances cannot prevent the convalescence of a large proportion of those who are attacked; and when the treatment is conducted in accordance with the settled principles that control the general therapeutics of all other diseases, the mortality is comparatively trifling.

Ligature of the Primitive Iliac Artery for Traumatic Aneurism. By RALPH N. ISHAM, M. D., Prof. of Operative Surgery in Chicago Medical College, etc.

CASE. August Tapka, Private, Co. K, 35th Wis. Vols., age 25, was admitted to the Military Department of the U. S. Marine Hospital, Sept. 30th, 1864.

He had received a bayonet wound of the right buttock through the ischiatic notch, while stationed at a camp near Milwaukee, March 18th, 1864. He bled to the extent of 16 or 20 ounces from the wound; the urine, which had to be drawn by the catheter for four days after the injury was received, contained much blood. There also occurred at once great swelling of the abdomen and right buttock. He was kept under treatment at Camp Washburn two months, when the swelling decreased and he began to walk. On the 12th of July he was reported fit for duty, and ordered to join his regiment at White River, Ark. He arrived there in a condition totally unfit for any service; the tumor rapidly returned, with much pain, in consequence of which he was hardly able to walk with the use of a cane. The swelling continuing to increase, after two days in the regimental hospital, he was sent to the general hospital at New Orleans. He states that he was then treated with applications to relieve his suffering, which he described as a "hammering pain" in the tumor with a corresponding movement in the part, which he had often observed himself. Not improving, he was fur-

loughed, placed upon a hospital boat and sent North. A surgeon on the boat opened the tumor with a bistoury, evidently mistaking its true character; blood escaping from the wound, it was immediately closed. Oozing continued to occur from this time; the patient arrived in Chicago in an exceedingly weakened condition, and was received into this Hospital.

On admission he was suffering great pain, referred to the tumor and right leg with constitutional irritation. He was anæmic with a quick and small pulse and anxious expression of countenance, presenting, in short, the appearance of one who had suffered from great loss of blood. On inspection there was a hard, tense, red and glistening tumor occupying the right nates, extending from the crest of the ilium to the natal fold, and from the right border of the os-sacrum to and over the anterior spinous process of the ilium. The cicatrix of the original wound was nearly in its center, and beside it was the recent wound made by the surgeon who opened the tumor, dilated to the size of a half-dollar and filled with clots of blood, through which (Oct. 2d) arterial blood escaped for the first time since admission. He complains of the throbbing pain and numbness of the limb, with difficulty of voiding urine.

A bruit is heard by applying the ear over the tumor, but no pulsation is audible. On the occurrence of the first hemorrhage in the Hospital, (Oct. 2d,) an injection into the sac of a solution of perchloride of iron was resorted to, with the effect of temporarily arresting the hemorrhage. On the 5th and 6th of October, patient improving. Meanwhile, the hemorrhage again occurred, notwithstanding the repetition of the injections. He had been seen by several medical gentlemen, who at first advised palliative measures. Upon further consultation, however, it was decided to wait no longer, but that *the operation of tying the common iliac artery* be performed for his relief. Accordingly, October 7th, 2 P. M., he was placed under the influence of chloroform by Sergeant Griffith, U. S. A., Hospital Steward, and assisted by Surgeon L. H. Holden, U. S. A., Medical Director, and Dr. Terry, A. A. Surgeon, U. S. A., and others, I proceeded to perform the operation. I made a curvilinear incision from in front of the extremity

of the last rib downwards and forwards to the crista ilii, then forwards above and along the crest, terminating at the anterior superior spine. The muscles were successively divided, with the fascia transversalis at the bottom of the incision, and the peritoneum being protected by two fingers introduced into the sub-peritoneal interval, the wound was enlarged to the extent of the original incision. The peritoneum was carefully lifted uninjured by the hand, together with the intestines, from the fascia iliaca, retained by an assistant, and the vessel exposed to view, not a drop of blood obscuring the parts. The ureter was lifted by the peritoneum. The vessel was ligated with a Mott's artery needle. The tightening of the ligature not only arrested the circulation in the limb, but diminished the size of the tumor so that its surface, which before was very tense, was now quite flaccid. The wound was properly closed, with the end of the ligature escaping from it, the patient placed in bed, limb in proper position, and enveloped in cotton.

Evening, 7 o'clock. Patient is resting comfortably, is free from pain, pulse 90. Bottles of warm water are kept near the limb which is enveloped in cotton, to maintain its warmth. Morphine, one-half grain. Oyster broth.

Saturday, Oct. 8th, 7 A. M. Patient slept well all night, limb warm, says he feels "very well," pulse 113. Ordered tr. verat. virid., 4 gtt. At 8 P. M., pulse 80, having passed a comfortable day. Color has returned to the limb with natural warmth. The wound is discharging pus and is in a healthy condition. Complains of some pain in stomach and bowels. Ordered a small dose of morphine, oyster broth and beef-tea.

Sunday, Oct. 9th. Is very comfortable, pulse 90, wound looking well, but an offensive discharge from sac appearing; *the clots were turned out*, and it was injected with a solution of permanganate of potassa.

Monday, Oct. 10th, 8 A. M. Pulse 80, patient feels well; all symptoms look favorable, but sanious and offensive discharges from the sac continue. Injections repeated to-day. 12. A. M. Pulse 90, limb natural, but patient is bathed in perspiration; the discharge from the sac is very offensive. 9

P. M. Is worse, pulse 115, wound of sac gangrenous, and, Tuesday, Oct. 11th, 10 A. M.,—dead.

Post-mortem examination showed a healthy condition of the artery, a well organized clot extending from ligature to aorta; no evidences of peritonitis. The wound of the artery proved to be in the anterior trunk of the internal iliac, within the sacro-ischiatic notch. The enormous sac was gangrenous. There were no appearances to account for the hæmaturia in the early history of the case. The difficulty of diagnosis in this case between gluteal aneurism and hemorrhage from within the pelvis, was only relieved by the previous history. The intelligent patient positively stated that the swelling first appeared within the crest of the ilium, where he had seen the pulsations; nor was there any additional evidence gained by a rectal examination. Whilst it was thus settled that the aneurism had its origin within the pelvis, the remaining uncertainty as to its true source decided that the operation should be on the common iliac. Had it been a gluteal aneurism, the operation to be resorted to would have been plainly that of turning out the clots and tying the artery through the sac, according to Astley Cooper's method, revived and practiced by Syme. An interesting feature in the case is, the disappearance of the tumor and its subsequent return, constituting that rare occurrence known as *secondary aneurism*, or perhaps, more strictly speaking, a recurring aneurism, for it would seem that the tumor did not occupy precisely the same position after its recurrence as before. A curious and interesting case of recurring aneurism is detailed by J. B. Cutter, M. D., of Newark, in the *American Jour. of Med. Sciences*, for Oct., 1865, after ligature of the external iliac artery, and for which the primitive was tied without success. The statistics of this operation when performed for arrest of hemorrhage or traumatic aneurism, are so very unfavorable as to cast a doubt over the mind of the judicious surgeon, as to whether it ever ought to be performed under these circumstances. In Prof. Stephen Smith's collection of cases, (*Am. Jour. of Med. Sciences*, for July, 1860,) thirty-two in number, seven recovered. Of these cases eleven were for the arrest of hemorrhage in wounds, or

in surgical operations, only one of which recovered. To these should be added Dr. Cutter's, Dr. Hammond's, of San Francisco, for gluteal aneurism, and my own, making fourteen cases with one recovery. And from the history of these cases, even when a prospect of recovery is promised by the temporary disappearance of the tumor, it is quite sure to return after the anastomotic circulation is established. Thus far the operation when performed for hemorrhage or traumatic aneurism, has not offered any prospect of success, and I believe that if the ligature is admissable it must be placed at the wound by the old operation, and that the application of the ligature by Hunter's method, in those cases where the wound of the artery cannot be reached, will rarely succeed. The gangrene may be accounted for in the enormous size which the tumor attained, owing to the laxity of the parts in which it was situated, and its being subjected to much pressure and irritation during his long journey from New Orleans, producing an inflammation of the sac, and breaking up with decomposition of the clots, instead of fibrinous consolidation.

PROCEEDINGS OF MEDICAL SOCIETIES.

CHICAGO MEDICAL SOCIETY—APRIL, 1866.

The fourteenth annual meeting of the Society was held on the evening of April 6th, 1866, at the residence of Dr. A. Groesbeck. The attendance was unusually large.

The following members were chosen officers for the ensuing year:

President—Dr. A. Groesbeck.
Vice-President—Dr. J. P. Ross.
Secretary and Treasurer—Dr. T. D. Fitch.

Delegates to the meeting of the American Medical Association, to be held at Baltimore, May 1, 1866, were chosen as follows: Drs. Chas. G. Smith, R. C. Hamill, T. D. Fitch, N. S. Davis, and W. D. Faxon.

The following were appointed delegates to the meeting of the

Illinois State Medical Society, to be held at Decatur, Tuesday, June 5th: Drs. E. L. Holmes, J. P. Ross, S. Wickersham, R. C. Hamill, S. C. Blake, G. C. Paoli, T. J. Bluthardt, S. J. Avery, D. B. Trimble, N. T. Quales, Ira Hatch, W. L. Faxon, and A. Fisher.

After the transaction of business, the members were invited by the host to partake of the bounties of the supper table, richly loaded with all the delicacies the heart (!) could wish.

During the past year the Society has enjoyed more than ordinary prosperity. The meetings have been generally well attended, and the discussions interesting and profitable. The papers which have been read from time to time, the reports of cases, and the pathological specimens exhibited by different members, would do credit to the medical society of any city.

Few physicians in Chicago can well afford to lose the benefit which directly and indirectly the attendance upon the meetings of this Society ensures.

We trust efforts will be made during the coming year to render the meetings of the Society even more instructive than they have been. This can be done if members will present the fruits of their experience, whether derived from private practice or from the different hospitals, infirmaries or dispensaries of the city.

At the meeting of April 13th, Drs. R. G. Bogue and B. Durham, Jr., were elected members of the Society.

Dr. Davis gave a verbal report, regarding the sanitary condition of the city during the past two months. There had been nothing peculiar in the weather to induce an unusual prevalence of disease, although catarrhal affections had been common. He had not observed any tendency to affections of the bowels, which could be considered as precursory to cholera. The city must be regarded as unusually healthy. The deaths during the past month were less in proportion to the population, than during the corresponding season for the past ten years; and yet the condition of our city was disgraceful in the extreme. Although there was an unpardonable neglect in removing the unusual amount of filth from the streets, alleys and yards, the temperature had been so low that these accumulations were now

comparatively harmless. Almost every vacant lot was covered with water, which is also found stagnant under nearly two-thirds of all the dwellings of the city. This, also, was comparatively innocuous during cold weather; but as the temperature becomes elevated and the ground partially dried, the emanations from the filth everywhere found in the city could not but prove prejudicial to the health of our populace. Attention was called to the importance of removing all vegetable and animal substances scattered so profusely around dwellings, as, also, of draining yards and vacant lots in such a way that the surface water may be rapidly conducted into the sewers.

Dr. J. Bartlett read an interesting report on cholera with statistics.

CHOROIDAL TUMOR.

Dr. Holmes exhibited a tumor of the choroid, with the following history: Two years ago a lady, about 50 years of age, consulted him about a pain in and near the right eye, which had already existed some weeks. Vision was totally destroyed; the pupil contracted and filled with exudation; the iris discolored and lying almost in contact with the cornea which was still transparent; the globe was abnormally hard. Extirpation of the eye was advised, to which, however, the patient was unwilling to submit. For two years, she was under the treatment of various practitioners, who endeavored in vain to relieve her suffering. Her health had become much impaired. On recently applying to Dr. H. again, she was willing to submit to the operation of extirpation. The globe divided through its centre, was found to be filled with solid material. The structure of the tumor was principally fibroid cells and exudation corpuscles, which could be seen in the specimen under the microscope kindly prepared by Dr. Lyman.

Such tumors are the products of hypoplastic choroiditis, and are non-malignant in character. After the removal of the eye, the patient at once recovered her health.

ELEPHANTIASIS OF THE CLITORIS.

Dr. Lyman exhibited a specimen of this rare disease, which was removed by Dr. McClure, from a patient at the Alms

House. She was a woman about twenty-five years of age, the mother of several children, and had suffered with constitutional syphilis. The clitoris commenced to enlarge about three years previous to the time of its removal. It formed a pendulous bifid tumor, dangling between the thighs, and reaching half way to the knees. Its surface was nodulated, and was ulcerated at several points, exuding a most offensive discharge. The tumor was easily removed by amputation after the application of a whip-cord ligature around its pedicle. The stump cicatrized in eight days after the operation. Microscopical examination showed fibrous and connective tissue as the principal elements of the mass.

Dr. Hildreth described the peculiar effects of ℥vi. of chemically pure sulphuric ether administered to a patient at the Cook County Hospital. Perfect anæsthesia was produced in ten minutes. The patient appeared as if under the influence of a poisonous dose of opium, the muscles being perfectly relaxed, pulse 80. He was unconscious, and unable to swallow fluids placed in the mouth. Coffee and brandy introduced into the rectum, and flagellation, with strong aqua ammonia held to the nostrils, aroused him. In three and a half hours the patient had fully recovered.

FRACTURE OF THE BASE OF THE SKULL.

Dr. McAllister related the history of a case in which a gentleman had been thrown from a carriage, striking his head against a railroad tie. On visiting him a few hours after the accident, he found him insensible, with blood flowing from the right ear. The discharge soon became serous in character. In sixty hours, consciousness returned; in seven days the patient was apparently in perfect health, and able to attend to his ordinary business.

Several members in reference to this case, expressed an opinion that there was undoubtedly a fracture of the base of the skull, and that the patient was not yet out of danger.

Dr. J. W. Brooks stated that one of his own children speedily recovered from a severe injury of the head, accompanied by bleeding from the ears and nose. The child appeared perfectly

well, and was able to attend school. Death occurred, however, five months after the accident. An examination revealed an abscess of the brain, with fracture of the base of the skull.

Dr. Tucker stated that he had sometime since treated a child, who had fallen into the hold of a vessel, producing a discharge of blood from the nose and ears. The recovery was speedy, and the health was good years after the injury.

Allusion was made to the fallacy in diagnosis in these cases, if the blood from the nose should flow into the ears, as could readily happen in certain positions of the head.

TRICHINA SPIRALIS.

Dr. Lyman exhibited under the microscope, specimens of trichina spiralis, taken from pork cured at the packing houses of Chicago. Of 1394 swine examined, trichinæ were found in twenty-eight.

SYPHILIS.

Dr. C. G. Smith related the particulars of a case of syphilis communicated by an infant to its wet nurse. When the nurse took charge of the child, it had eruptions on the surface, and a sore mouth, of the character of which, however, she was ignorant. In three weeks she discovered indurated ulcers around the nipples. In two months there appeared a syphilitic roseola on the neck and arms. Mercurial inunctions for ten days, caused the eruptions to disappear, and the ulcers to heal, although the indurations remained.

A member related the history of a young woman, whose irreproachable character left no doubt of the truth of her narrative, who experienced the horrors of syphilitic innoculation, through a kiss from the gentleman to whom she was engaged. A chancre upon the lip was the result of this caress, and subsequent medical investigation revealed the fact that the young man was at the time under treatment for syphilitic ulceration of the throat.

At the meeting of April 27th, Drs. D. T. Nelson, Wm. Knox, Geo. K. Amerman and E. Ingals, were elected members of the society.

DE WITT COUNTY MEDICAL SOCIETY.

The Society met in annual session, in Clinton, at the office of Dr. Shurtleff, on Monday the 2d day of April, 1866, Dr. Tyler in the Chair.

The minutes of the previous meeting were read and approved.

On motion of Dr. Madden, Dr. Drombolone and Dr. Jno. A. Edmiston were invited to participate in the proceedings of the meeting.

The election of officers being in order, the following gentlemen were elected for the ensuing year: President, Dr. John Wright; Vice-President, Dr. B. K. Shurtleff; Secretary, Dr. C. Goodbrake; Censors, Dr. J. H. Tyler, Dr. R. T. Richards and Dr. T. W. Davis.

Delegates to the Ill. State Medical Society, Dr. R. T. Richards, Dr. B. K. Shurtleff and Dr. T. W. Davis.

Delegates to the American Medical Association, Dr. B. S. Lewis and Dr. T. K. Edmiston.

Dr. Tyler, the retiring President, then delivered an address on the diseases most prevalent in DeWitt county during the past year, for which he received the thanks of the Society.

Dr. John A. Edmiston, of Clinton, and Dr. Charles W. Drombolone, of Marion, having applied for membership, and the Censors having reported favorably, they were unanimously elected members of the Society.

Dr. Z. H. Madden reported a case of intermittent fever, followed by partial paralysis, which called up a discussion, in which most of the members present participated.

The essayists appointed at the last meeting, having failed to fulfill their duty, were continued, and the President also appointed Drs. J. A. Edmiston and C. W. Drombolone to read each an essay at the next meeting.

Cholera was chosen as the subject for discussion at the next meeting, and after the passage of a series of sanitary resolutions, referring to the impending epidemic, the Society adjourned to meet in quarterly session at Clinton, on the 1st Monday of July next, at 10 o'clock A. M., at Dr. Shurtleff's office.

C. GOODBRAKE, *Sec'y.*

SELECTED ARTICLES.

SURGERY.

On Chronic Ulcers. By FREDERICK C. SKEY, F. R. S., etc. —The more chronic the ulcer, the larger its size, the more aged the subject, the more remarkable is the influence of opium in effecting its cure. Treat such a case of chronic ulcer of the largest size, having a pale, flat, bloodless base, a high mound of lymph around it, covered by unhealthy integument, the sore pouring out a large quantity of watery ichor, saturating the linen, stockings, and other appliances—I say, select such a case, occurring in old age; give such a man ten or fifteen drops of tincture of opium night and morning, leave his bowels alone, and observe the base of the sore in five or six days; it will exhibit a number of minute red points, which, daily increasing in number, will rise up in the form and identity of healthy granulations, and cover the entire surface of the ulcer. Contemporaneously with the gradual elevation of the base of the ulcer is the descent of the surrounding eminence, and the commencement of the process of cicatrization. If I desired to select an ulcer on behalf of a student, with a view to illustrate the character of perfect granulations as they appear in a thoroughly healthy example, I would select an ulcer which had been treated by opium in preference to any other. If it be supposed by any man having limited experience in the employment of opium, that any evil to the constitution attaches to the use of that valuable agent, I can only reply that its salutary action on the ulcer is obtained solely through the healthy influence it exercises on the constitution. Judiciously employed, no drug in our pharmacopœia is more innocuous.

MISCELLANEOUS.

On a New and Ready Method of Producing Local Anæsthesia. By BENJ. W. RICHARDSON, M. A., M. D., F. R. C. P., Senior Physician to the Royal Infirmary for Diseases of the Chest.

When the toy for diffusing eau de cologne in fine vapor over the skin, in the form of spray—which some time ago found its way into our drawing-rooms—first came before me, it struck me at once that it might possibly be applied to the production of local anæsthesia; and I set to work to try its applicability in this respect. I was soon afterwards assisted largely in my labors by taking advantage of Siegle's apparatus, with the hand-ball spray-producer invented by my valued friend, Dr. Andrew Clarke, and supplied by the manufacturers, Messrs. Krohne & Sesemann, of Whitechapel road.

With this apparatus I set myself to determine the degree of cold that could be produced by the vaporization of all the known volatile liquids, and I determined the fact that the intensity of the cold produced, held a definite relationship to the boiling-point of the fluid used; the rule being that the lower the boiling-point, the greater was the amount of cold exhibited. In these inquiries I employed a very delicate thermometer, directing the spray upon the bulb from half an inch to an inch and a-half from the point of the jet. By these means I learnt that with rectified sulphuric ether, I could bring down the thermometer within 10 degrees Fahr. of zero, and that by directing the jet on the skin, I could produce a certain definite and marked degree of local insensibility, but not sufficient for surgical purposes.

I next got Mr. Krohne to construct for me a hollow cylinder of thin metal, six inches long and three inches in diameter. In the circumference of this cylinder was a chamber one-eighth of an inch in diameter for containing ether. The ether communicated with a tube which was joined to an air-tube, as in Siegle's apparatus, and the centre of the cylinder was filled with ice and salt mixture. In this way the ether was reduced to zero, and when vaporized gave spray which brought down the thermometer six degrees below zero, and produced on the skin such entire insensibility that I could pass a needle through the part without sensation. On the 11th of December, 1865, I applied this process for the first time on the human subject for an operation. The patient was a lady, who required to have five front teeth extracted. I had previously administered chloroform to this lady for a tooth extraction, but the inhalation had produced so much irregularity in the action of the heart and other disagreeable symptoms, that I considered it inadvisable to repeat chloroform, and she herself was only too ready to give the local measure a trial. The extraction was performed by my friend, Mr. Peter Matthews. On directing the ether spray first at a distance and then closely upon the gum, over the first central incisior on the left side, we observed, at the end of fifty seconds, that the gum had become as white as the tooth itself, and quite insensible. I then directed the vapor upon the tooth for twenty or thirty seconds more, and on the patient intimating that she did not feel, I suggested to Mr. Matthews to proceed. He extracted a very firm tooth without the slightest expression of pain. The process being continued in the same manner, he extracted three other teeth with the forceps. The other gave way, and had to be removed by the lever; but in all cases the result was equally good. Not a drop of blood was

lost; there was no painful reaction; and the healing process proceeded perfectly. Our patient, who was exceedingly intelligent, was specially requested to note every step of the operation, such as the applying of the forceps, the insertion of the blades beneath the gum, the loosening process, and the removal. She told us that in two of the extractions she felt nothing; that in one it seemed as though the jaw altogether were being pulled downwards, but without pain; that in another she was conscious of a kind of wrench or loosening but without pain, and that the introduction of the lever was attended with a momentary dull ache, just perceptible. On the whole, the process was quite as painless as when she took chloroform.

On December 13th I applied the local anæsthetic to the same lady for the further extraction of nine teeth, Mr. Peter Matthews again operating. The results were equally good with the first seven, at which point, unfortunately, the apparatus partly ceased play. At the eighth tooth pain was felt, and at the ninth, the apparatus being out of play, the operation caused great pain. We regretted this much, although it gave us the information of the perfect action of the process when no mechanical obstacle interfered with it. The reason why the apparatus stopped play was very singular, and could hardly have been foreseen. It arose from the condensation of water derived from the air in the air-tube, and from the blocking up of the fine jet with a little portion of ice.

In the next step of research I got Mr. Krohne to make for me an apparatus with two spiral tubes, one the air-tube, the other a tube for ether; and I immersed these spirals in a closed chamber filled with ice and salt. The degree of anæsthesia at first produced was most intense, and Mr. Spencer Wells was good enough to allow me the opportunity of applying the process in a case where an operation was required for closing a perineal rupture. Unhappily the apparatus, from the very same cause as before, ceased to yield a current; water condensed and became frozen in the air-tube. The apparatus itself was also found to be too cumbersome for practical purposes; I therefore, in this trial, failed to obtain any result.

By this time I had been led, very reluctantly, to the fact that the use of ice and salt for reducing the ether was a failure when the plan came to be tried in practice, nor could I see any ready way of preventing the difficulties that were brought before me. Added to these difficulties there was another, which has always attended my friend, Dr. Arnott's plan, viz., that of getting the ice and salt readily for operation. To succeed, therefore, it was quite requisite to dispense with ice and salt altogether.

In considering how this object could be achieved, it occurred to me that if a larger body of ether than is supplied by Siegle's apparatus, could be brought through the same jet, by mechanical force, in the same interval of time, and with the same volume of air, a proportionate increase of cold must necessarily be produced. The theory was one of pure physics, admitting even of arithmetical demonstration, and running parallel with the lessons which had been taught me with respect to the cold produced by liquids having different degrees of boiling point. The theory was put to the test at once, and proved correct to the letter. By driving over the ether under atmospheric pressure, instead of trusting simply to capillary action—or to suction, as in Siegle's apparatus—the spray evolved brought the thermometer within thirty seconds to four degrees below zero—the result that was desired.

Ascertaining this truth, I instructed Messrs. Krohne and Sesemann to construct a proper apparatus. It consists simply of a graduated bottle for holding ether; through a perforated cork a double tube is inserted, one extremity of the inner part of which goes to the bottom of the bottle. Above the cork a little tube, connected with a hand bellows, pierces the outer part of the double tube, and communicates by means of the outer part, by a small aperture, with the interior of the bottle. The inner tube for delivering the ether runs upward nearly to the extremity of the outer tube. Now, when the bellows are worked, a double current of air is produced, one current descending and pressing upon the ether forcing it along the inner tube, and the other ascending through the outer tube and playing upon the column of ether as it escapes through the fine jet. By having a series of jets to fit on the lower part of the inner tube, the volume of ether can be moderated at pleasure; and by having a double tube for the admission of air, and two pairs of hand bellows, the volume of ether and of air can be equally increased with pleasure, and with the production of a degree of cold six below zero.

By this simple apparatus, at any temperature of the day and at any season, the surgeon has thus in his hand a means for producing cold even six degrees below zero; and by directing the spray upon a half-inch test tube containing water, he can produce a column of ice in two minutes at most. Further, by this modification of Siegle's apparatus, he can distribute fluids in the form of spray into any of the cavities of the body—into the bladder, for instance, by means of a spray catheter, or into the uterus by an uterine spray catheter.

When the ether spray thus produced is directed upon the

outer skin, the skin is rendered insensible within a minute; but the effects do not end here. So soon as the skin is divided, the ether begins to exert on the nervous filaments the double action of cold and of etherization; so that the narcotism can be extended deeply to any desired extent. Pure rectified ether used in this manner is entirely negative; it causes no irritation, and may be applied to a deep wound, as I shall show, without any danger. I have applied it direct to the mucous membrane of my own eye, after first chilling the ball with the lid closed.

I have now employed this mode of producing local anæsthesia in four cases on the human subject. The first case was the extraction of a tooth from a lady, the operation being performed by my friend and neighbor, Dr. Sedgwick, on January 24th of this year. On the 29th of the same month I used it again on the same lady for the extraction of three very difficult teeth, Dr. Sedgwick again operating. The results were as satisfactory as in the previous case, where the ice and salt ether apparatus was used.

I have used the apparatus also in connection with my friend, Mr. Adams, who had a case at the Great Northern Hospital of deep dissecting abscess, in the thigh of a young woman. In the abscess there was a small opening, which just admitted the director. I first narcotized around this opening, and the director being introduced, Mr. Adams carried his bistoury nearly an inch deep, and one inch in the line of the director. I then narcotized the deep-seated parts, and enabled him to cut for another inch and a half in the same direction. The director was then placed in the upper line of the abscess, the process was repeated, and the incision was carried two and a half inches in that direction. The patient was entirely unconscious of pain, and after narcotizing the whole of the deep surface, Mr. Adams inserted his fingers, and cleared out the wound without creating the slightest evidence of pain.

Afterwards, in the case of a lacerated wound, six inches long, in the arm of a boy, who had been injured with machinery, I narcotized while six sutures were introduced by Mr. Adams. The first needle was carried through without the anæsthetic, and caused expression of acute pain; the remaining eleven needles, after a few seconds' administration of the ether spray, were passed through painlessly. The twisting of the wire sutures gave no pain.

These results are so interesting, that I make no apology for bringing them at once before my medical brethren. I wish it to be distinctly understood, that at the present moment I only introduce the method here described for the production of

superficial local anæsthesia. It is, I believe, applicable to a large number of minor operations, for which the more dangerous agent chloroform is now commonly employed—I mean such operations as tooth extraction, tying nævus, tying piles, incising carbuncles, opening abscesses, putting in sutures, removing small tumors, removing the toe-nail, dividing tendons, operating for fistula, removing cancer of the lip, and other similar minor operations which I need not mention. The process may also be applied to reduce local inflammation.

In course of time, and guided by experience and the advancement of science, we may, however, expect more. If an anæsthetic fluid of negative qualities, as regards irritation of nerve, and which has a boiling point of 75° or 80°, can be obtained from the hydro-carbon series, the deepest anæsthesia may be produced, and even a limb may be amputated by this method. It may also turn out that certain anæsthetics may be added to the etherial solution with advantage, such as small quantities of chloroform, or some of the narcotic alkaloids, if they could be made soluble in ether. A solution of morphia and atropia combined, if they could be diffused through ether, which at present seems impossible, could thus be brought into action so as to cause deep insensibility. In operating on the extremities it would be good practice to stop the current of warm blood, by making pressure above on the main artery.

Reaction from the anæsthesia is in no degree painful, and hemorrhage is almost entirely controlled during the anæsthesia.

One or two precautions are necessary. It is essential, in the first place, to use pure rectified ether; methylated ether causes irritation, and chloroform, unless largely diluted with ether—say one part in eight—does the same.—*London Medical Times and Gazette.*

Antagonism of Morphia and Atropia.—The antagonistic action of morphia and atropia is a subject of the highest physiological interest. The inquiries of Drs. Keen, Moorhouse, and Mitchell have shown, (*a*) that these drugs do not counteract one another as regards their effects on the circulation; (*b*) that as regards the eye, they are mutually antagonistic, but the action of atropia is the more permanent; (*c*) that the cerebral symptoms, produced by either drug, are capable in a great measure of being overcome by the other, but there is some difficulty in establishing the proper balance; (*d*) that atropia does not diminish the nausea produced by morphia; (*e*) that the two medicines are antidotal, as regards their effects on the brain, but they have exactly the same effect on the bladder.—*Lancet.*

MEDICAL NEWS.

Prof. Hamilton is preparing a new edition of his work on Fractures and Dislocations.

Homœpathy has signally failed in the treatment of the rinderpest in England, where it was fairly tested.

Obituary.—Died, recently, in Edinburgh, Scotland, Dr. James Simpson, son of Prof. James Y. Simpson, a young physician of great promise.

Horse-Flesh as Food.—Markets for the sale of horse-flesh have been officially established at Paris, Vienna, Stockholm, and Copenhagen.—*N. Y. Med. Record.*

The Cholera has broken out with great virulence on the Rhine, and may be expected to spread over Germany, Holland, Belgium and England, during the approaching summer.

A wealthy gentleman of Boston has placed a sum of money in the hands of an architect, for erecting a monument in that city to commemorate the discovery of the anæsthetic properties of Ether.

Prof. Brainard was in Rome, with his family, on March 14, the date of his last letter to friends in Chicago. His health has improved, and he was expected to make a tour through Italy, then go to Paris.

Dr. Mott's Will.—The entire value of the estate of Dr. Valentine Mott is stated to be about $400,000. His anatomical museum goes by his will to the New York Medical College. —*Pacific Med. and Surg. Journal.*

The Surgeon-General has had constructed a beautiful model of the Hicks United States Army General Hospital at Baltimore, Md., which he designs to send to France, to be exhibited at the Paris Exposition of 1867. The model is of wood, and is made on the scale of one inch to twenty feet.

Honors to Medical Men.—We have heretofore announced that Prof. James Y. Simpson, of Edinburgh, has been made a Baronet. The Queen of England has further seen fit to bestow the same distinction upon William Ferguson, the eminent Surgeon of London, and Dr. Dominick Corrigan, one of the first Physicians of Dublin.—*Cin. Lancet and Observer.*

Maximilian has founded a Medical School in Mexico, which requires seven years to complete the course of studies; about two hundred students have been in attendance, but unless the Imperial dynasty has better fortune than some of its preceding Governments, the founder of both Empire and School will scarcely have the honor of attending its first Commencement Exercises.

Dr. Wm. A. Hammond, Late Surgeon-General U. S. A.—It is stated in some of the daily papers, that Dr. Hammond "has gone to Europe, in charge of a grandson of the late John Jacob Astor; and a correspondent says that he receives for his services $10,000 in gold for six months, all travelling and subsistence expenses liberally paid, and $3,000 for each month beyond the six."—*Cin. Lancet and Observer.*

The Emperor of France has, recently, conferred upon Dr. J. Marion Sims the Cross of the Legion of Honour, in acknowledgment of the meritorious services rendered to the great cause of Obstetrical Surgery. Dr. Sims, as is well known, first attracted public attention during the period of his residence in Montgomery, Alabama, and had, in a subsequent practice of seven years in New York City, honestly earned the distinction which was there awarded to him. He moved to Europe during the late war, and now labors professionally, both in London and Paris.

Charivari has a picture of the cholera, as a horrible spectre, rousing the slumbering International Commission by a fierce attack; while, on this side of the water, *Harper's Weekly* has a similar figure, foreshadowing to avaricious landlords what they may expect both in New York and Chicago.

THE regular Annual Meeting of the Illinois State Medical Society will be held at Decatur, Tuesday, June 5.

VACCINE VIRUS.—Physicians in the country can obtain healthy and reliable virus by forwarding $1 to R. M. Lackey, M. D., P. O. Box 2175, Chicago.

NEW MEDICAL JOURNALS.—*The Medical and Surgical Monthly*, Memphis, Tenn. Edited by Drs. Ramsey, Saunders, Willett and White.

The Atlanta Medical and Surgical Journal. Edited by Dr. J. G. Westmoreland and Dr. W. F. Westmoreland.

Messrs. TICKNOR & FIELDS, of Boston, have placed upon our table their welcome serials for May. The established reputation of the *Atlantic Monthly* leaves no room for additional praise. *Our Young Folks* is the most readable of all the periodical issues designed for the rising generation; and *Every Saturday* is a weekly which contains, in the form of judicious selections, the cream of current literature.

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PURE AND GENUINE

LIGHT STRAW-COLORED MEDICINAL

COD LIVER OIL.

Prepared on the Seashore of Cape Cod and Cape Ann, by our Mr. Caswell, personally, from Fresh and Selected Livers.

The universal demand for an article of Cod Liver Oil that could be depended upon as *strictly pure, and scientifically prepared*, having been long felt by the Medical Profession, we were induced to undertake its manufacture at the FISHING STATIONS, where the fish are brought to land every few hours, and the livers, consequently, are in great perfection. Its manufacture is personally superintended by our Mr. Caswell, and every gallon made is closely scrutinized.

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This preparation presents to the Profession a combination of Iron, Phosphorous and Calisaya, in which the nauseous inkiness of the Iron and astringency of the Calisaya are overcome, without any injury to their active tonic principles, and blended into a beautiful amber-colored cordial, delicious to the taste, and acceptable to the most delicate stomach.

Each pint contains the virtue of one ounce of the Royal Calisaya Bark, and a dessert spoonful contains two grains of the salt.

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